CMX Clean Machine

The Best Rail Cleaning System for HO, N, O, S, and G Scales

test. Notice black lines. Then use CMX and perform test - no black lines.

THE CMX CHALLENGE When used as directed CMX Clean Machine will clean your track better than any other method

available or your money back. Clean your track by any method then perform the "white glove"

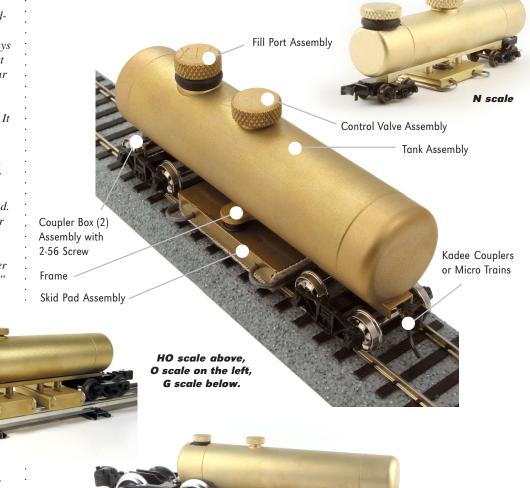
"This is a real quality product and you guys are to be congratulated."

"I've been in model railroading for most of my 56 years and cleaning track has always been a pain in the @#\$. Last week I purchased one of your CMX Clean Machines, I've tried most of the others. No question about that product. It really works very well!"

"Thanks for coming up with your CMX Clean Machine. I bought one for my railroad and was extremely impressed. I then took my cleaner to our club layout, and bingo - our dirty track problem was solved. We tried several other brands with limited success."

"The other members were estatic

about



the performance of the CMX Clean Machine! Everyone is pleased that we've found a car that works!"

"What a great product, it stays on the track, does a fantastic job especially when you have tunnels or covered passages."

"One of the better investments that I have made on my layout, very impressed with its performance."

Reviewed by Model Railroader Magazine, February 2000.

- Precision Machined Parts.
- Solid Brass Construction.
- Non-unraveling pads.
- Body mount Kadee couplers.
- Easy Fill Design.
- Leak proof valve and fill port.
- Heavy weight does the job.
- Quick Change Pads.

- Drag pads won't catch on switch points, frogs, and any other pieces of trackwork.
- Spill resistant design.
- Solvent proof design.
- Both solvent/abrasive options.
- Large Reservoir.
- Multi-directional (push or pull)
- Controllable dispensing rate.

CMX furnished complete, ready-to-run with 10 pads..

CMX Products, 57 River Road, Suite 1023, Essex Jct, Vermont 05452, Tel. 800-671-0641

MADE IN THE USA

Track and Wheel Cleaning

Clean track, and wheels are absolutely necessary for reliable Command Control operations.

Track Cleaning

Semi-Abrasive Pads: Brite Boys, Masonite Pads, Ink Type Erasers, are just a few of the inexpensive semi-abrasive cleaning pads that are available. These pads all remove oxidation and maybe some contaminants but have one serious drawback. As soon as you start using them, the pads begin to load up with organic contaminants and eventually will spread a thin layer of these contaminants on your track. You know the rest!

There is an inexpensive non-loading alternate. Your local paint supply or hardware store should have a special sanding mesh used for sheetrock. This sheetrock sanding mesh is like fiberglass window screen with a #250 grit bonded to the mesh. Due to the fact it's a mesh, it will not load up. You can staple it to an appropriate block of wood and you are all set. It's easy to replace and one sheet will last years. Use gently applying light pressure.

Chemical Deoxidants and Conductivity Enhancers:

A product like Zip and others fit this category. These compounds are generally applied to sections of track and then locos are run around the layout to disperse the compound until a uniform condition is achieved. My understanding is that traction is poor for awhile but then improves. I have no personal experience with these materials and personally have reservations about adding organic material on the rails.

Solvent Cleaners:

Water Soluble Type: Most track cleaning liquids sold are water soluble degreasers and similar to Fantastic* or 409*. While safe to use and environmentally friendly, these cleaners are weak degreasers and can leave a residue. You will have to use these often to maintain a clean track.

Alcohols and Slow Solvents: Alcohols are often used in common liquid track cleaners as described above. Alcohols are also weak degreasers and will leave residues and are flammable. Paint thinner, Naphtha, Goo Gone, etc. These solvents have a moderate evaporation rate, are moderate degreasers, flammable and environmentally restricted. They work better than solvents listed above. Slow solvents are not very effective in removing silicone or rubber residues from loco tires.

Fast Solvents: Nail Polish Remover, Lacquer thinner, Acetone, and MEK.

CAUTION: These solvents are volatile and flammable. Read label carefully and follow all instructions for use. Fast solvents, when properly used, are superior for track cleaning. These solvents are aggressive and virtually vaporize all organic matter, leaving no residue.

Liquid Dispensing Cars:

Tank type with pad dispenser (see Pads). IHC, International Hobby Company, sells one for about \$20.00. The car is a plastic caboose with metal; pad mount, needle valve and reservoir. The reservoir is small; it will often require refills on large layouts. Because the car body is plastic, it will not be compatible with some of the slow solvents or any of the fast solvents.

Rolling Pad Cars:

This type of car retails for about \$60.00. The cleaning pad is in the form of a roll that rotates while the car is moving. This type of car can only use slow solvents because the roll pad is the reservoir and fast solvents would evaporate. Also, the rolling pad does not scrub the track because the pad is rolling. While this product is in widespread use and is effective, it will fail the white glove test when compared to a pad type car.

The Clean Machine +:

After struggling through all of the cleaning options stated above, CMX Products is now manufacturing Clean Machine +, tank type/ pad cleaning cars. See Picture on mailer. All brass, except trucks, HO weighs about 1 pound, N weighs 8 oz. CMX+ is guaranteed to clean your track safely and effectively when used as directed. **Cleaning Pad Material:**

We have found all cloth type cleaning pads, supplied by hobby stores, to be inferior. Your best bet is a corduroy type of upholstery fabric with backing. This will not unravel and the ribs can be oriented perpendicular to rails to assist scrubbing action while minimizing pad loading. NOTE: The liquid pad type cleaning cars described above can be converted to abrasive type cleaners by changing pads to the same mesh described above or fine 600+ Emmory cloth.

Wheel Cleaning

All Wheel Drive Diesels: Use strong paper towel or light cloth, soak with any commercial alcohol, lay flat on straight section of track with power on. Place one truck set at a time on cloth. Power up loco to spin wheels on cloth. Repeat for other truck set. When complete, place loco on clean towel to let surfaces dry. Caution alcohols are flammable.

All Other Steam/Diesel Locos And All Rolling Stock: Use cotton swab dipped in acetone or preferred solvent, apply to wheels and rotate until visibly clean. Caution: Metal and Nylon/Delrin (most plastic wheels) are not affected by acetone, but plastic car body/ parts (usually acetate) will be dissolved, etched or bonded by acetone. Observe cautions stated herein.

Crusted Wheels: Some wheels accumulate a thick crust of gunk usually after many hours use without cleaning. This crust is best removed by using an appropriate X-acto type knife, followed by swab and acetone. Notes: Wire and nylon brushes used on roto tools may be used with caution. Plastic wheels can be melted and nickel plating may be removed.

Operating Instructions

CAUTION: CMX is not a toy, NOT to be used by children under 12 years of age.

Getting Started

Please read and follow all recommendations and instructions stated herein for CMX+

Clean the Clean Machine

Contaminants from the machining and assembly processes may remain in the tank of your CMX+. To clean, fill the tank as stated per Sect B. Use an aggressive solvent. Insure that both fill cap & control valve are tightened securely. Shake well to agitate to clean. Empty contents in suitable container by draining & removing control valve completely.

(A) SKID PAD ADJUSTMENT, CLEANING PAD INSTALLATIONS

1) The skid pad is designed to snap on/off via skid pad spring clips.

2) The cleaning pad is installed by rotating spring clip appropriately and wrapping cleaning pad, velvet side down, around skid pad, so that cleaning pad is centered and the pad ends do not protrude into large hole on skid pad.

3) CMX+ may be used as abrasive type cleaner by installing abrasive type pads. Sheet rock sanding mesh (Fine) is good or 600+ Emory paper

(B) SOLVENT HANDLING AND FILLING

Solvents are most easily and safely dispensed by using a 5 -10 cc syringe which is available at pharmacies for dispensing children's liquid medicines, and cost about \$1.50. Handling and filling should be performed on suitable surface in suitable area.

1) Close control valve, turn screw knob clockwise until valve seats.

2) Remove fill port cover. Screw.

3) Use syringe and draw 3CC solvent. Transfer solvent slowly to CMX+ through fill port, use from 4CC to 9CC.

4) Keep fill port cap on during use, but do not tighten completely or vent will be closed preventing proper drip rate.

5) Crack open control valve, observe drip rate by holding CMX+ above surface and viewing nozzle.

6) Adjust drip rate to about 10-15 drops per minute or less. CW reduces drip rate, CCW increases.

7) NOTES

7.1) No drip, drip not adjustable or drip migrates up nozzle exterior.

Check fill port.....Plug should be loose. Nozzle blocked....Use wire or needle to clear. Solvent level too low.....Min. 3CC needed. Add more solvent.

7.2) When drip is adjusted as described above CMX+ will not harm plastic ties or painted areas even when standing still. Cleaning pad allows solvents to evaporate. It is a good practice to tighten fill plug and close valve completely when CMX+ is not in use.

7.3) In some instances droplet from nozzle may migrate up exterior of nozzle and to other surfaces of the CMX. This may happen sometime with certain solvents because of the fluid viscosity. This can be corrected by adding 5 to 10% portion of water to the cleaning solvent.

Warning: Proceed at your own risk. Failure to read, understand, and follow all instructions stated herein and furthermore stated on labels, and by the manufacturers of solvents, will result in damage and harm to you, the environment, or your equipment.

(C) OPERATING

1) CMX+ comes to you ready to run.

2) CMX+ may be pushed or pulled by any locomotive with

sufficient traction. Short, 8 wheel drive, four axle diesels are ideal. For highly contaminated track place CMX+ before power unit. (2 Loco's may be needed)

3) Cleaning pad should be sufficiently wetted with solvent to clean properly. This can be usually seen as wetness on pad or cool feeling of skid pad. This is about 10 drops a minute. Cleaning pad should be centered on skid pad fore to aft and right to left.

4) Cleaning pad may be cleaned while in use by using a solvent wetted rag and rubbing cleaning pad until dirt is removed. Pads may also be washed in detergent and be reused.

(D) MISCELLANEOUS NOTES

1) CMX+ meets NMRA gauge dimensions (HO).

2) CMX+ is designed so nozzle receives solvent about 1/8" above bottom of tank. This leaves sediments at bottom of tank and protects nozzle from clogging. This is about 3CC volume and gives false impression of being usable solvent.

3) CMX+ has limited spill fill port design. The fill port protrudes about 1/8" into tank creating inside lip to impede spills. Held inverted about 1-2 CC of solvent will still remain in CMX+.

4) Truck mounting screws, #2-56 style, should not be overtightened or thread damage to screws or bolster may result.

5) Standard Athearn delrin trucks have been supplied to minimize short circuits. The mounting is good for many other truck types if you choose.

6) CAUTION: When removing plug, or valve stem from CMX+, be sure "O" rings and packing washers remain in place.

7) Initially, your layout may require several passes with CMX+ to clean properly. Once clean, you will only need to use CMX+ once or twice a year.

(E) Solvent Options:

The following solvents may be used with CMX+:

Most aggressive group

(Observe precautions stated on container and herein) Nail Polish Remover, Laquer Thinner, Acetone, MEK, Toluene & Xylene.

This group of solvents are the most effective but the most dangerous. You will probably need to use these to start and then once a year thereafter. Plastic from wheels and other organic matter is the most significant contaminant on your track. Since you need to follow the same precautions for all the solvents in this group, use Nail Polish Remover or Acetone, which are readily available.

Moderately aggressive group

(Observe precautions stated on container and herein) Alcohols, Paint thinner & Water based solvents (Fantastic or 409)

This group of solvents will not remove plastic but are satisfactory for routine maintenance.

P. S.

- CMX+ is designed to work efficiently at normal speeds (1-2 ft/sec). If you run too slow the pads may pick up dirt & debris that has settled on your layout.
- 2. If you have trouble inserting pads, try adjusting the spring clips.
- The skid pad furnished with your CMX+ has been chosen to work for most layouts. Since all layouts are somewhat unique, you may want to choose a pad material to suit your needs.
- 4. The CMX pad material is cut from corduroy upholstery fabric. Upholstery fabric has a backing which minimizes the unraveling of the fabric. Most fabric stores have corduroy upholstery fabric.

Updated 04/10/2001.

Chemist Reviews CMX Clean Machine

The following review of the CMX "Clean Machine" was performed by Charlie Miller, a retired chemist. I asked Charlie to do this review because as a chemist he would have a better technical basis to do so.

Track Cleaning - A Chemist's Perspective

Few aspects of model railroading evoke as much controversy as track cleaning. Opinions on how to clean our rails are as varied as the ages of model railroaders. The one thing about this subject that we seem to agree on is that dirty track interferes with engine performance and reduces the level of enjoyment of our hobby. From a model railroader who is also a chemist, the following opinion is presented:

When we say we have dirty track, we are really saying we have failed to achieve good electrical contact between the rails and the motive power pick-up wheels. This condition is obviously not the only cause of poor locomotive performance, but it may be the most common one. Unfortunately, most forms of "rail dirt" are very poor conductors of electricity. As I see it, dirty rails are the result of contamination from three sources. Each of these has its own set of characteristics, which are described briefly below.

Oxidation - primarily an inorganic form of track contamination. Oxidative degradation occurs, over time, with most materials that are exposed to air. In many cases, this happens too slowly for us to notice, as with plastics and painted surfaces. With metal surfaces, however, oxidation is generally more rapid, and metal oxides are usually poor electrical conductors. Track manufacturers have minimized this oxidation tendency by using nickel/silver plating. Metal wheels on engines and on some brands of rolling stock are sometimes more susceptible to oxidation than the track itself. Friction between wheel and track can cause transfers of wheel oxidation to the track surface.

Organic contamination - Organic material (by the chemist's definition) is composed of chemical compounds containing carbon. This covers a wide variety of both natural and synthetic materials. Sources of organic contamination include residual material from plastic wheel sets, non-volatile residues from various cleaning preparations, fingerprints, and other oily substances.

External contamination - This category covers all other forms of contamination, which may be organic or inorganic. Single filament lint strands and other airborne particulates fall into this category. Other examples include smoke from tobacco products, hair spray aerosols, dust from various plaster-type modeling compounds, and overspray from air brushes. Any of these might contribute to the formation of a coating on the track, too thin to see, but thick enough to inhibit electrical contact.

Because of this array of potential sources for what we broadly refer to as "dirt" on model railroading track, it is difficult, if not impossible, to define what we might call a "standard dirty track". Lacking such a standard, we are left with a rather subjective approach for measuring the effect of our cleaning efforts. For most model railroaders, the ultimate proof of a clean track lies in our ability to operate our locomotives in a consistent and trouble-free manner.

The removal of dirt from our rails seems to be best accomplished through a combination of physical scrubbing and chemical softening of the rail dirt. Both of these techniques can be employed when using the "Clean Machine".

For inorganic contamination (primarily metal oxides), the physical scrubbing method is probably the best choice, in the form of some type of abrasion. As CMX Products has already discussed, the non-clogging sheet-rock sanding mesh pads work well for this. The CMX has adequate weight (even when the tank is empty) to provide constant abrasive force against the rails.

Organic contaminants tend to be softer and more cohesive than inorganic oxides. These properties make them less likely to be removed by abrasion alone, and the assistance of chemical agents is usually needed. This means using solvents or liquid cleaning preparations which dissolve and/or dislodge the contaminating coating on the track surface. Since the CMX is designed to allow adjustable rates of solvent application, it is also ideally suited to this technique.

The question remaining, then, is: What chemical, or combination of chemicals, will provide acceptable allaround results in the efficient removal of foreign organic material from the rail surfaces? To help us answer this question, let's consider the properties of organic contamination in more detail. Residual material from plastic wheels on rolling stock is a chief source of organic contamination. (I believe this has been analyzed and documented by the NMRA.) The plastic itself is subjected to friction as the wheels roll along the track. Think of how many revolutions each wheel makes in a complete circuit of your layout. When multiplied by the contact of the many wheels on even a short train, the gradual degradation occurring at a molecular level begins to build up. Please be aware also that the plastic wheels have "additives". To give the wheels their authentic color, carbon black or other dark pigment is usually added to the polymeric resin before it is used to form the wheels in the injection molding process. Thus, over time, tiny amounts of these pigments will accumulate at the wheel surfaces and transfer onto the track. Although some forms of elemental carbon can be good electrical conductors, when mixed with other residues, carbon is probably only a contributor to the overall dirty condition.

Also, the injection molding process usually requires something called a "mold release agent", without which the manufacturer would have difficulty removing the cast wheels from the mold. Unless this release agent is removed from the wheel surfaces in some later step of the process, it too can transfer to the track.

Organic chemical solvents are available in a bewildering assortment. Solvents vary in strength according to their chemical nature, characterized by a chemist's term called "polarity". Unfortunately, "stronger" is not always better, since it depends on what type of contamination we are attacking. A simple rule of thumb to remember when dissolving a solid is "like dissolves like". This approach can be quite effective in a chemical laboratory, where we often know what material we are trying to dissolve. Two practical examples of solvent polarity effects come to mind: Sugar is freely soluble in water (water and sugar both being highly polarized chemicals) but totally insoluble in something like lighter fluid or mineral spirits. On the other hand, ordinary paraffin wax is fully soluble in relatively non-polar solvents like lighter fluid or mineral spirits, but virtually insoluble in water.

Since we, as model railroaders, have no means of identifying the individual track contaminants, we may as well proceed in a "worst case" orientation. In doing so, we can simply assume that there could be some of all three categories of contamination present on our rails. Because we are usually dealing with such a "hodgepodge" of contaminants, we need something that covers a wide range of solvent strengths. The best we can hope for is to partially dissolve and loosen most of the foreign matter and have it transfer onto the cleaning pad. As one of my fellow model railroaders is quick to point out, if we soften the foreign matter on the rails without removing it, we are simply "making mud", which will dry out and remain on the rails after the solvent evaporates.

My recommendation for this broad utility cleaning agent is lacquer thinner. Read the label. Lacquer thinner usually contains a mixture of petroleum distillates, methanol, toluene, acetone, methyl ethyl ketone, propylene glycol monomethyl ether acetate, ethyl acetate and xylene. Some of these chemicals are not even available to the general public in their pure form. (Further reading will also inform you that this mixture "cannot be made non-poisonous" and that it is highly flammable. These properties of lacquer thinner mean that it must be used with utmost caution.) Because of the array of solvent strengths represented here, lacquer thinner is well suited for track cleaning, and in conjunction with the CMX, it is probably more effective than any single-component solvent.

Perhaps the issue of volatility should be addressed here. Many organic solvents, such as the lower molecular weight alcohols (methanol, ethanol, propanol) and ketones (acetone, methyl ethyl ketone) have boiling points well below that of water. The lower the boiling point, the more readily a solvent will evaporate. Very volatile solvents are sometimes referred to as "fast" solvents. With the exception of toluene and xylene, all the listed ingredients of lacquer thinner are fast solvents. This is why the adjustable flow control on the CMX unit comes in handy. The user can adjust the flow to compensate for evaporative loses, thereby keeping the pad wet during the entire cleaning operation.

So here (finally) is the bottom line: To me, from the chemist's perspective, the CMX, when used with lacquer thinner on the sorptive pad, is the best method of mechanized track cleaning presently available. It allows you to apply constant and consistent wiping pressure against the track surfaces, even in places (like tunnels) where you can't easily reach by hand. It allows you to dispense a continuous stream of fresh solvent onto the pad, replacing the solvent lost to evaporation and keeping the pad at a suitable "wetness". The large reservoir assures long operation between refills. Finally, using the Clean Machine is much more enjoyable than going along the track with a finger wrapped in a cloth. It's also safer, because you would not want prolonged skin contact with lacquer thinner. And after all, isn't "having fun safely" what this hobby is all about?

Having said all this, it is obvious to me (and hopefully to you) that it makes very little sense to clean the track so thoroughly unless you also clean your locomotive wheels and your rolling stock wheels. During my evaluation of the CMX, I looked closely (under 3X magnification) at some of my n-scale plastic wheel sets. I was appalled at the visual difference between freshly cleaned and "uncleaned" wheels.

For cleaning black plastic wheels, I recommend only methanol (methyl alcohol). Some of the solvents contained in lacquer thinner are strong enough to soften and distort some types of plastics. (If you don't believe this, try pouring a little lacquer thinner into an ordinary Styrofoam coffee cup, but make sure you have a more suitable catch basin under it.) Just to test this, I soaked a discarded black plastic wheelset in lacquer thinner for about one half hour. When removed from the solvent, it was a gooey mass, with no resemblance to its original shape. Although better quality rolling stock wheels are usually either Nylon or Delrin, some cheaper brands appear to use polystyrene. Nylon and Delrin are relatively impervious to most solvents; polystyrene is not. So, to be on the safe side, I believe it's best to use methanol.

Charlie Miller 9/6/2001

Comments and Suggestions

I spent several days trying to make the CMX fail by doing things I thought others might attempt to do. (Well, only some of the things they might do... I didn't try dropping the unit or throwing it against the wall. And I didn't eat the spare set of o-rings.) I did not experience any "failure" that I could expressly attribute to the machine itself. Comments follow:

My layout is n-scale and consists of two interconnecting loops, a switching yard, and various sidings. I have probably 50 - 55 feet of track in all. I had better luck pushing the unit ahead of the loco, because my track was so dirty from neglect and lack of use for the past three months. (Model railroad operation is mainly a "cold weather sport" for me.) Since I was mostly using lacquer thinner in the machine, I was a little concerned that I might have a fire, if a spark from my engine armature happened to contact the trailing solvent vapors. Apparently most modern engines are pretty well shielded, for this never happened.

I didn't have any trouble with the lacquer thinner "crawling" along the metal surfaces of the machine. As you mention in para. 7.3 of the instructions, this "migration" can occur with some solvents. It is a function of surface tension as well as viscosity. I suspect that the mixed solvents within lacquer thinner tend to minimize this effect.

I found that a cleaning pad length of about 1.25" was ideal. It may help some users to suggest this length for them in para. 2), under "cleaning pad installation".

You may want to add a precautionary statement somewhere in the instructions about not placing the machine on a "live" track without a pad installed, as this could lead to a short circuit.

Two additional comments on the "Track and Wheel Cleaning" write-up that comes just prior to the "Operating Instructions":

I agree with your assessment of chemical deoxidants and conductivity enhancers and have similar "reservations about adding organic material to the rails". To me, any addition of non-volatiles to the track surface is going to cause subsequent problems, sooner or later. Since the Clean Machine works so well, there should be no need for such materials.

You were being kind in your comments about rolling pad cleaning cars. As you said, they offer no scrubbing action, especially when used with something such as "Goo-Gone", where these rollers do a fantastic job of coating the track without removing anything.

Charlie Miller 9/6/2001

User Reviews Cleaning Cars

The following review of some popular cleaning cars was fowarded to us, unsolicited, and is used herein with permission.

This is one of our FAVORITE topics here. (grin)

I have a track cleaning car fetish. I own them all. Anyone I can find from the crumby Roco tank with a dragging pad to the newest CMX. I have even built some of my own design with varying results. I have tried them all and they all have plusses and minuses that have mostly been touched on here. I will try not to repeat the ones I agree with. The fun thing about this subject is peoples cleaning situations can be very different. Some have lots of dust or humidity or spiders... Your mileage will vary!!

ONE PASS CLEANING.

How well does the track act with regular locos after I have run my cleaner around once. For this I like to use Alcohol in the wetable cleaners.

1st CMX

2nd Monsoon 3rd 2 Centerlines (one wet one dry) 4th Aztec Dry 5th Masonite drag pad 6th Bright boy drag pad.

MULTI PASS CLEANING.

How well do my regular locos do after the cleaning car has been looping for about 30 minutes on my layout. (about 10 laps) I find the ones with bright boy like characteristics fair much better and almost match the we tables. I still find the CMX to be a little better.

1st CMX 2nd Aztec Dry 3rd Monsoon 4th Masonite drag pad 5th Bright boy drag pad 6th 2 Centerlines (one wet one dry)

EASE OF USE

Well, anything you don't have to put anything in or tie anything to comes in tops.

1st Bright boy drag pad. Does not seem to ever need cleaning itself.
2nd Masonite drag pad. Sometimes needs cleaning or replace the pad
3rd Aztec dry. Have to clean the roller from time to time.
4th CMX Easy to fill and regulate flow
5th Monsoon. Flow is harder to set and harder to fill.
6th Centerline. Have to replace the wipes and they dry out fast in use.

NOTES: One thing about the Aztec cleaners that sometimes bothers me is the magnet. True, it does pick stuff up, but what usually happens to me is it derails in a tunnel because of a spike on the magnet gets hung up on something. I like the fact it got it of the track for me, but I hate fishing the derailed car out of the tunnel.

All in all, I use them all at different times for different reasons....cleaning spurs I use the Centerlines cause I can add lots of cleaning fluid to them on really dirty track very easily... Over all, right now I like the CMX the best, until someone comes out with a newer better one...and I will HAVE to have that one too!!!

Sean B. McCaskey Owner - TBA Railway http://www.pegnsean.net/tba/